[4910-13]

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 23

[Docket No. FAA-2015-3678; Special Conditions No. 23-268-SC]

Special Conditions: Korea Aerospace Industries, Ltd., Model K-100; Full Authority Digital Engine Control (FADEC) System.

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final special conditions; request for comments.

SUMMARY: These special conditions are issued for the Korea Aerospace Industries, Ltd., Model K-100 airplane. This airplane will have a novel or unusual design feature(s) associated with the use of an electronic engine control system instead of a traditional mechanical control system. The applicable airworthiness regulations do not contain adequate or appropriate safety standards for this design feature. These special conditions contain the additional safety standards that the Administrator considers necessary to establish a level of safety equivalent to that established by the existing airworthiness standards.

DATES: The effective date of these special conditions is **[INSERT DATE OF PUBLICATION IN THE FEDERAL REGISTER].**

We must receive your comments by **[INSERT DATE 45 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].**

ADDRESSES: Send comments identified by docket number FAA-2015-3678 using any of the following methods:

- Federal eRegulations Portal: Go to http://www.regulations.gov and follow the online instructions for sending your comments electronically.
- Mail: Send comments to Docket Operations, M-30, U.S. Department of Transportation (DOT), 1200 New Jersey Avenue, SE., Room W12-140, West Building Ground Floor, Washington, D.C., 20590-0001.
- Hand Delivery of Courier: Take comments to Docket Operations in Room W12-140 of the West Building Ground Floor at 1200 New Jersey Avenue, S.E., Washington, D.C., between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays.
- Fax: Fax comments to Docket Operations at 202-493-2251.

Privacy: The FAA will post all comments it receives, without change, to http://regulations.gov, including any personal information the commenter provides. Using the search function of the docket website, anyone can find and read the electronic form of all comments received into any FAA docket, including the name of the individual sending the comment (or signing the comment for an association, business, labor union, etc.). DOT's complete Privacy Act Statement can be found in the Federal Register published on April 11, 2000 (65 FR 19477-19478), as well as at http://DocketsInfo.dot.gov.

Docket: Background documents or comments received may be read at http://www.regulations.gov at any time. Follow the online instructions for accessing the docket or go to the Docket Operations in Room W12-140 of the West Building Ground Floor at 1200

New Jersey Avenue, SE., Washington, D.C., between 9 a.m., and 5 p.m., Monday through Friday, except Federal holidays.

FOR FURTHER INFORMATION CONTACT: Jeff Pretz**,** Federal Aviation Administration**,** Small Airplane Directorate, Aircraft Certification Service, ACE-111, 901 Locust, Room 301, Kansas City, MO 64106; telephone (816) 329-3239, facsimile (816) 329-4090**.**

SUPPLEMENTARY INFORMATION:

The FAA has determined, in accordance with 5 U.S. Code §§ 553(b)(3)(B) and 553(d)(3), that notice and opportunity for prior public comment hereon are unnecessary because the substance of this special condition has been subject to the public comment process in several prior instances with no substantive comments received. The FAA therefore finds that good cause exists for making these special conditions effective upon issuance.

Special Condition Number	Company/Airplane Model
23-237-SC	Spectrum Aeronautical Model S-40
23-246-SC	Cirrus Design Corporation Model SF50
23-253-SC	Diamond Aircraft industries Model DA-40NG

Comments Invited

We invite interested people to take part in this rulemaking by sending written comments, data, or views. The most helpful comments reference a specific portion of the special conditions, explain the reason for any recommended change, and include supporting data. We ask that you send us two copies of written comments.

We will consider all comments we receive on or before the closing date for comments. We will consider comments filed late if it is possible to do so without incurring expense or delay. We may change these special conditions based on the comments we receive.

Background

On December 21, 2009, Korea Aerospace Industries, Ltd., applied for a type certificate for their new Model KC-100 airplane. The KC-100 is a normal category single engine four passenger composite low wing airplane with a maximum takeoff weight of 3600 pounds. It has fixed tricycle landing gear and is designed for both Visual Flight Rules (VFR) and Instrument Flight Rules (IFR) operations.

The KC-100 will use an electronic engine control system (FADEC) instead of a traditional mechanical control system. The engine control system will be certificated as part of the engine; however, the installation of an engine with an electronic control system requires evaluation due to critical environmental effects and possible effects on or by other airplane electronic systems, shared engine and airplane data and power sources.

The regulatory requirements in 14 CFR part 23 for evaluating the installation of complex systems, including electronic systems and critical environmental effects, are contained in § 23.1309. When § 23.1309 was developed, the use of electronic control systems for engines was not envisioned. Therefore, § 23.1309 requirements were not applicable to systems certificated as part of the engine (reference § 23.1309(f)(1)). Parts of the system that are not certificated with the engine could be evaluated using the criteria of § 23.1309. However, the integral nature of these systems makes it unfeasible to evaluate the airplane portion of the system without including the engine portion of the system. In some cases, the airplane that the engine is used in will

require a higher classification than the engine controls are certificated for; requiring the FADEC system to be analyzed at a higher classification. As of November 2005, FADEC special conditions mandated the classification for § 23.1309 analyses for loss of FADEC control as catastrophic for any airplane using a FADEC. This is not to imply an engine failure is classified as catastrophic, but that the digital engine control must provide an equivalent reliability to mechanical engine controls.

Type Certification Basis

Under the provisions of 14 CFR 21.17, Korea Aerospace Industries, Ltd., must show that the KC-100 meets the applicable provisions of part 23, as amended by amendment 23-1 through 23-59**,** thereto.

If the Administrator finds that the applicable airworthiness regulations (i.e., 14 CFR part 23) do not contain adequate or appropriate safety standards for the KC-100 because of a novel or unusual design feature, special conditions are prescribed under the provisions of § 21.16.

In addition to the applicable airworthiness regulations and special conditions, the KC-100 must comply with the fuel vent and exhaust emission requirements of 14 CFR part 34 and the noise certification requirements of 14 CFR part 36. The FAA must issue a finding of regulatory adequacy under § 611 of Public Law 92-574, the Noise Control Act of 1972.

The FAA issues special conditions, as defined in § 11.19, under § 11.38 and they become part of the type certification basis under § 21.17(a)(2).

Special conditions are initially applicable to the model for which they are issued**.** Should the type certificate for that model be amended later to include any other model that incorporates

the same novel or unusual design feature, the special conditions would also apply to the other model under the provisions of § 21.101(a)(1).

Novel or Unusual Design Features

The KC-100 will incorporate the following novel or unusual design features:
an electronic engine control.

Discussion

The Model KC-100 makes use of an electronic engine control system instead of a traditional mechanical control system, which is considered a novel design for this type of airplane. The applicable airworthiness regulations do not contain adequate or appropriate safety standards for this design feature. Maintaining a structured assessment to determine potential installation issues mitigates the concern that the addition of a full authority engine controller does not produce a failure condition not previously considered.

Applicability

The special conditions are applicable to the KC-100. Should Korea Aerospace Industries, Ltd., apply at a later date for a change to the type certificate to include another model incorporating the same novel or unusual design feature, the special conditions would also apply to that model as well.

Conclusion

This action affects only certain novel or unusual design features on the KC-100. It is not a rule of general applicability and affects only the applicant who applied to the FAA for approval of these features on the airplane.

The substance of these special conditions has been subjected to the notice and comment period in several prior instances and has been derived without substantive change from those previously issued. It is unlikely that prior public comment would result in a significant change from the substance contained herein. Therefore, notice and opportunity for prior public comment hereon are unnecessary and the FAA finds good cause, in accordance with 5 U.S. Code §§ 553(b)(3)(B) and 553(d)(3), making these special conditions effective upon issuance. The FAA is requesting comments to allow interested persons to submit views that may not have been submitted in response to the prior opportunities for comment described above.

List of Subjects in 14 CFR Part 23

Aircraft, Aviation safety, Signs and symbols.

Citation

The authority citation for these special conditions is as follows**:**

Authority: 49 U.S.C. 106(g), 40113 and 44701; 14 CFR 21.16 and 21.17; and 14 CFR 11.38 and 11.19.

The Special Conditions

Accordingly, pursuant to the authority delegated to me by the Administrator, the following special conditions are issued as part of the type certification basis for Korea Aerospace Industries, Ltd., Model KC-100 airplanes**.**

1. **Electronic Engine Control**

a. For electronic engine control system installations, it must be established that no single failure or malfunction or probable combinations of failures of Electronic Engine Control (EEC) system components will have an effect on the system, as installed in the airplane, that causes the

Loss of Thrust Control (LOTC)/Loss of Power Control (LOPC) probability of the system to exceed those allowed in part 33 certification.

b. EEC system installations must be evaluated for environmental and atmospheric conditions, including lightning. The EEC system lightning and high intensity radiated frequency effects that result during an LOTC/LOPC should be considered catastrophic.

c. The components of the installation must be constructed, arranged, and installed so as to ensure their continued safe operation between normal inspections or overhauls.

d. Functions incorporated into any EEC that make it part of any equipment, system or installation having functions beyond that of basic engine control, and may also introduce system failures and malfunctions, are not exempt from § 23.1309 and must be shown to meet part 23 levels of safety as derived from § 23.1309. Part 33 certification data, if applicable, may be used to show compliance with any part 23 requirements. If part 33 data is to be used to substantiate compliance with part 23 requirements, then the part 23 applicant must be able to provide this data for their showing of compliance.

Note: The term "probable" in the context of "probable combination of failures" does not have the same meaning as in AC 23.13091D. The term "probable" in "probable combination of failures" means "foreseeable," or not "extremely improbable," as referenced in AC 23.1309-1D.

Issued in Kansas City, Missouri on August 28, 2015.

Earl Lawrence
Manager, Small Airplane Directorate
Aircraft Certification Service

[FR Doc. 2015-22872 Filed: 9/10/2015 08:45 am; Publication Date: 9/11/2015]